AMENDMENT OF CLAIMS:

21. (Currently Amended) An apparatus for ascertaining the local oxygen turnover and/or the oxygen consumption and/or the O_2 transport capacity and/or the transported O_2 amount and/or the oxygen consumption rate and/or the oxygen turnover rate and/or the oxygen turnover rate and/or data derived from the content of tissue pigments, ascertained from the primary signals of the local hemoglobin concentration and/or the content of tissue pigments and/or the local oxygen saturation and/or the arterial oxygen saturation and/or the blood flow rate and/or the transported amount of blood and/or the tissue temperature with an optical sensor (S) for placing on the tissue, characterized by at least one white light source (W) and at least one laser source (L) which send light to the sensor (S), one or more detectors (DD, DR) which receive light backscattered from the tissue, and an evaluation unit, and characterized in that optical fibers are provided between light sources (W, L) and sensor (S) and between sensor (S) and detectors (DD, DR), with the optical fibers of the sensor (S) preferably being arranged on a circular shape around a central fiber or a temperature probe (DT), and in that one fiber each for the white light source (W) and for the laser (L), and in each case at least two detection fibers (DR, DD) lie on an arc of a circle at defined distances from the illumination sources, each of which is fed to a separate evaluation.

22. (Canceled)

23. (Previously Presented) The apparatus as claimed in claim 21, characterized in that a spectrometer, a spectroscope, a laser Doppler spectroscope, a tissue spectrometer, a tissue spectroscope and/or a pulse oximeter and/or a temperature measurement (DT) are provided as evaluation unit.

24. (Previously Presented) The apparatus as claimed in claim 21, characterized in that the primary signals are related to an optically determined measured volume and/or in that the measured volume of the optical sensor is determined and information is obtained from various depths by evaluation of the various wavelength ranges and at least one detector-transmitter separation.

25. (Canceled)

26. (Canceled)

27. (Currently Amended) The apparatus as claimed in claim ~~26~~ 21, characterized in that the detection fibers (DR) are evaluated together.

28. (Currently Amended) An ~~The~~ apparatus ~~as claimed in claim 21,~~ for ascertaining the local oxygen turnover and/or the oxygen consumption and/or the O_2 transport capacity and/or the transported O_2 amount and/or the oxygen consumption rate and/or the oxygen turnover rate and/or the oxygen turnover rate and/or data derived from the content of tissue pigments, ascertained from the primary signals of the local hemoglobin concentration and/or the content of tissue pigments and/or the local oxygen saturation and/or the arterial oxygen saturation and/or the blood flow rate and/or the transported amount of blood and/or the tissue temperature with an optical sensor (S) for placing on the tissue, characterized by at least one white light source (W) and at least one laser source (L) which send light to the sensor (S), one or more detectors (DD, DR) which receive light backscattered from the tissue, and an evaluation unit, and characterized in that the illuminated fibers for a white light source and/or a laser light source lie on an open or closed arc of a circle directly around the central fiber and are illuminated by one or more light sources,

with detection of the backscattered and/or laser Doppler signals taking place through the central fiber.

29. (Previously Presented) The apparatus as claimed in claim 28, characterized in that the illuminated fibers (W) and/or (L) lie on a larger radius and/or on different radii of a circle which are illuminated synchronously and/or alternately.

30. (Previously Presented) The apparatus as claimed in claim 21, characterized by a bundle of optical fibers which extends from the sensor (S) to the detector or to a camera, such as a color CCD camera, so that a two-dimensional image of the evaluated signals can be generated.

31. An ~~The~~ apparatus ~~as claimed in claim 30,~~ for ascertaining the local oxygen turnover and/or the oxygen consumption and/or the O_2 transport capacity and/or the transported O_2 amount and/or the oxygen consumption rate and/or the oxygen turnover rate and/or the oxygen turnover rate and/or data derived from the content of tissue pigments, ascertained from the primary signals of the local hemoglobin concentration and/or the content of tissue pigments and/or the local oxygen saturation and/or the arterial oxygen saturation and/or the blood flow rate and/or the transported amount of blood and/or the tissue temperature with an optical sensor (S) for placing on the tissue, characterized by at least one white light source (W) and at least one laser source (L) which send light to the sensor (S), one or more detectors (DD, DR) which receive light backscattered from the tissue, and an evaluation unit, characterized by a bundle of optical fibers which extends from the sensor (S) to the detector or to a camera, such as a color CCD camera, so that a two-dimensional image of the evaluated signals can be generated, and characterized by an additionally depth-selective sensor (S) or a depth-selective evaluation so that a

three-dimensional image of the recorded measurements can be generated.

32. (Previously Presented) An oxygen sensor as set forth in claim 21 for measurements on the eardrum, in which the primary signals of the tissue spectrometer (SO_2, Hb_{Amount}) and/or of the pulsatile tissue spectrometer and/or of the pulse oximeter ($SO_{2\ art.}$) and/or of the laser Doppler (blood flow) are recorded in a reflection measurement and combined with one another in order to be able to determine the oxygen parameters and/or the pigment parameters via the ear sensor.

33. (Previously Presented) The apparatus as claimed in claim 21, characterized in that the fibers with a separation x_i are illuminated and/or evaluated together.

34. (Previously Presented) The apparatus as claimed in claim 21, characterized in that a pressure indicator signal is generated via opposing light guides and/or light exit and entry regions and indicates the deformation of the tissue and/or of a membrane because of application of the sensor.

35. (Canceled)

36. (Canceled)